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ABSTRACT

The paper describes the development and psyhometric validation of an instrument to measure co-worker involvement with employees with handicaps in supported employment settings. The Co-worker Involvement Instrument contains 10 items pertaining to physical integration, social integration, vocational integration, training, associating frequency, associating nature, befriending, advocating, evaluating, and information giving; and was tested in 12 supported employment programs in Illinois. The reliability study was broken into studies of inter-rater reliability and test-retest reliability. Based upon 68 ratings made by rater pairs, the total score inter-rater reliability was estimated to be .82. In a second sample in which 18 different rater pairs scored the instrument, the total score was estimated to be .80. Based upon the comparison of ratings by the same rater separated by a period of time, the total score test-retest reliability was estimated to be .88. The validity of the instrument was supported by a face validity study in which only one item was considered appropriate to include by less than 80% of raters, and the instrument overall was considered an appropriate measure by 90% of the raters. Includes 22 references. (JDD)

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The Co-worker Involvement Instrument[1]

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Abstract

This paper describes the development and psychometric validation of the Co-worker Involvement Instrument. Studies of reliability included inter-rater and test-retest reliability. Validity studies included content and face validity. All reliability correlations met or exceeded .80, and the validity of the instrument was also supported. Potential applications of the instrument were also discussed.

The Co-worker Involvement Instrument

There has been great progress made in the integration of persons with handicaps over the past 15 years. In 1973, Section 504 of the Rehabilitation Act prohibited any state or local government as well as any private organization receiving federal funds from discriminating against an otherwise qualified person solely on the basis of the person's handicap. Education for all children with handicaps was federally mandated in 1975 (PL 94-142), as was the provision of transition services eight years later (Section 626 of the 1983 Amendments to PL 94-142). This combination of antidiscrimination legislation (Section 504) and federal grant programs (PL 94-142 and amendments) resulted in the anticipation of increasing opportunities for the high school graduate with handicaps. However, it seems that in spite of these legislative mandates, dramatic increases in opportunities for integrated employment have not occurred and unemployment rates of 50-75% pervade (U.S. Commission on Civil Rights, 1983). Apparently, changing expectations alone cannot ensure desired employment outcomes as it appears there may be a number of other factors that influence employment status.

Wehman (1981) identified parent, supervisor, and co-worker involvement as "other" factors impacting the employment of persons with handicaps. Traditionally, vocational educators/trainers have taken an individual level perspective of the employment context (Rappaport, 1977), a posture which places the responsibility for change on the target employee. The consideration of these outside influences represents a change from the total emphasis on the training needs of a specific student typified by special education's Individualized Education Plan (IEP), to a broadened outlook which considers interactions among individuals, groups and systems in the employment context.

Rusch and Minch (1988) reviewed empirical studies conducted in non-sheltered employment settings and found five functions which co-workers served in the instruction of target employees with mental retardation. These roles can be referred to as prescribed roles as they may be required of a co-worker. They were; a) validating instructional strategies (Schutz,

Rusch, and Lamson, 1980; Rusch and Menchetti, 1981), b) collecting subjective evaluations (Crouch, Rusch, and Karlan, 1984; Rusch, Weithers, Menchetti, and Schutz, 1980; Schutz, Jostes, Rusch, and Lamson, 1980; White and Rusch, 1983;), c) implementing training procedures (Crouch, Rusch, and Karlan, 1984; Kochany, Simpson, Hill, and Wehman, 1982; Rusch and Menchetti, 1981; Rusch, Weithers, Menchetti, and Schutz, 1980; Stanford and Wehman, 1982), d) collecting social comparison information (Crouch, Rusch, and Karlan, 1984; Rusch, Weithers, Menchetti, and Schutz, 1980; Rusch, Morgan, Martin, Riva, and Agran, 1985), and e) maintaining behavior in the context of actual employment (Rusch and Menchetti, 1981; Rusch, Weithers, Menchetti, and Schutz, 1980; Rusch, Morgan, Martin, Riva, and Agran, 1985; Kochany, Simpson, Hill, and Wehman, 1982; Stanford and Wehman, 1982). In a study of co-worker support to employees with handicaps, Minch (1987) also identified f) associating, g) befriending, and h) advocating as co-worker support roles. Because these roles demand initiation from the co-worker to the target employee, they are referred to as volitional roles. Finally, Rusch, Minch, and Hughes (in press), via interviews with supervisors alluded to another potential volitional role, i) information giving, so that in all, there are nine general roles identified in the literature.

Therefore, instructional roles make up five of the nine roles identified. As mentioned above, these can also be referred to as prescribed roles and collapsed into two general categories; training and evaluating. Training includes such roles as validating instructional strategies, implementing training procedures, and maintaining behavior in the context of actual employment. Evaluating includes collecting subjective evaluations and collecting social comparison information. Obviously, although these roles were assigned to categories, there is much overlap. For example, training must be based upon evaluation, and evaluation often results in training.

The remaining four of the nine roles were identified as co-worker support roles. As stated, these can also be referred to as volitional roles and include associating, befriending, advocating, and information giving. By volition, the implication is made that unless co-workers

desire this type of involvement, it will not occur. For example, although a co-worker can be required to evaluate another employee each co-worker himself makes the personal choice of whether or not to befriend, advocate for, or even associate with a target employee. This presents the potential problem of trying to motivate co-workers to become involved in roles which foster independence in employees with handicaps. Such problems and motivational means have been mentioned in the literature (White and Rusch, 1983). Although such relationships can be facilitated, they can hardly be mandated. Yet, it is suspected that they are crucial to successful employment.

The work associated with the identification of these nine roles is important because it indicates that co-workers are indeed involved with employees with handicaps in employment settings in a variety of ways (Minch, 1987; Rusch, Hughes, Johnson, and Minch, 1988; McNair, 1989). This finding is fundamental to the future development of a theory of the impact of co-workers on the employment status of persons with handicaps.

Although this preliminary research has demonstrated that co-workers are involved with employees with handicaps in integrated employment settings there is still a great deal of work to be done. Co-worker involvement could prove to be a potentially mitigating variable in such activities as vocational training and job match. In addition it may contribute to job retention in supported employees. An important first step in the study of the impact of co-worker involvement on the aforementioned variables is the development of a reliable and valid instrument to measure co-worker involvement with supported employees. It is the goal of this study to describe the development and psychometirc validation of such an instrument.

The Co-worker Involvement Instrument (The Instrument)[2]

The Co-worker Involvement Instrument (Rusch, Hughes, & McNair, 1988) contains ten items. The items were drawn from the literature identified above, and from the experience of the authors of the instrument. Items pertain to (a) physical integration, (b) social integration, (c) vocational integration, (d) training, (e) associating frequency, (f) associating nature, (g)

befriending, (h) advocating, (i) evaluating, and (j) information giving. The items are defined in Table 1.

Insert Table 1 about here

Scoring Procedures

The Instrument is designed to be scored by an employment specialist or a supervisor. Each item may be scored by selecting one of three choices (2,1, or 0) resulting in a maximum score of 20. Scoring procedures are similar for each item and in every case items are scored on the basis of information gathered from employment site experience, relevant documents, observations and/or verbal reports. Verbal reports can come from the target employee himself/herself, co-workers, supervisors, and/or an employment specialist.

Insert Figure 1 about here

Co-workers are identified as potential sources of information according to the Co-worker Identification and Interview Procedure outlined in Figure 1. Verbal report information is collected via a co-worker interview schedule, which allows the scorer to collect all the information needed to score the Co-worker Involvement Instrument in a single interview. To be considered valid, the co-worker's or target employee's verbal report must be corroborated by the target employee (in the case of a co-worker report), another co-worker, an employment specialist or a supervisor. Individuals such as parents, group home or independent living staff can also be used for validation of Item 7, (Befriending). Once information is validated, the Instrument is then scored using that particular information. If information is not corroborated by any of the above mentioned persons, the scorer must disregard that information and begin again with another co-worker. If three co-workers have been approached and none of them knows or interacts with the target employee or knows of someone who does, then the process is stopped. The Instrument is then scored based upon

observational and relevant document data. It is important to note that although these specific procedures are outlined for identification of co-workers and scoring of specific items, it is assumed that employment specialists and supervisors will have a high degree of familiarity with the job site, the target employee, and co-workers. As a result, they should be able to score the instrument using the individual item scoring procedures alone. The instructions for scorers (including the Co-worker Identification and Interview Procedures) are therefore provided largely to guide a scorer only in the event that specific information is not known to him or her.

Specific scoring procedures for each item are outlined in the Co-worker Involvement Manual. By way of example, Item 1, Physical Integration, states that "Target employee works, takes breaks, and eats meals in the same areas at the same time as co-workers." The item can then be scored in one of three ways. A score of two corresponds to the statement "Target employee works in the same work areas at the same time as co-workers a portion of the day and takes breaks and eats meals in the same areas (ie., in the same room, within 600 square feet) as co-workers." A score of one indicates that the "Target employee does not work in the same areas at the same time as co-workers but takes breaks and/or eats meals in the same areas as co-workers." Finally, a score of zero corresponds to the statement "Target employee does not work, take breaks, or eat meals in the same areas or at the same time as co-workers." The information necessary to score this item is gathered via observations during lunch, work breaks, and during actual work on-the-job. Relevant documents can also be considered such as work or observational records.

A second example is Item 5, Associating (frequency), which states, "Co-worker socially interacts with the target employee at the work place." This item is scored on the basis of whether the "Co-worker socially interacts with the target employee at the work place on a regular basis, typically on a daily basis," (scored two), "Co-worker interacts with the target employee at the workplace on an irregular basis, usually only a few times per week," (scored one), or "Co-worker interacts with the target employee at the workplace on an irregular basis, usually only once or twice a month. Interactions are not intentional," (scored zero). The information necessary to score this item is also gathered from relevant documents, observational records, and in this case, verbal

reports by co-workers, the target employee, the employment specialist or job supervisor. However, verbal reports by co-workers or the target employee must be corroborated by one of the following persons; supervisor, employment specialist, target employee (in the case of a co-worker report) or another co-worker. Corroboration simply involves getting agreement from the corroborator that associating (in this case) did occur with one of the persons mentioned.

Methods

Sample

Forty-nine supported employment projects across the State of Illinois were contacted requesting their participation in the Co-worker Involvement Study. Of the 49, 17 projects expressed interest in the study. However, five of these projects were not included because they either did not meet the minimum criteria of having a target employee in a supported employment program for at least three consecutive months or they later decided not to be involved. Twelve projects were then contacted and a visit arranged. At that time, target employees were selected by the local project personnel (supervisors or employment specialists) for involvement in the study. In some cases, the individuals selected were the only ones working in a particular agency's supported employment program. However, in larger agencies a particular employment specialist might be working with a supported employee unknown to other employment specialists working through the same agency. This was most often the case resulting in target employees being selected on the basis of the two raters having ongoing contact with the target employee in the employment setting.

Reliability

Reliability was measured in two ways, inter-rater reliability and test-retest reliability. The instrument is designed to be scored by employment specialists and/or supervisors. It is therefore crucial that co-worker involvement be scored by each rater in the same manner. Further, the American Psychological Association (1985) indicate that the degree of concordance across independent ratings should be reported as an indication of reliability. A test-retest reliability study was also indicated. By correlating scores given at two separate times by the same rater, the instrument's consistency of measurement over time was assessed.

Insert Figure 2 about here

The reliability studies were organized as displayed in Figure 2. At time 1, rater 1 and rater 2 scored the instrument independently in reference to a single target employee. The comparison of these ratings comprised the inter-rater reliability study.

A test-retest study was also undertaken. The comparison of rater one's score at time 1 with his/her score at time 2 comprised the test-retest reliability study.

Inter-rater Reliability. The raters in the inter-rater reliability studies were either employment specialists or supervisors working with supported employment programs across the state of Illinois. They had to meet the requirement of having had involvement in the job site for a minimum of three consecutive months prior to scoring the instrument. The target employees worked at a variety of jobs across the four placement types.

The types of placements in which target employee's were working were individual placements, clustered enclaves, dispersed enclaves or mobile work crews. Within the placements, various job types were represented. They were light industrial, laundry, warehouse, maintenance, retail, food service, clerical, and health care.

As mentioned above, the instrument was designed to be scored by employment specialists, or supervisors familiar with a job site for a minimum of three months. Prior to an agreed upon date on which the instrument was to be scored, the investigators sent each rater a copy of the instrument with the instructions to read the manual and to be prepared to score the instrument on a particular target employee at a specified time. At that time (time 1), two raters independently scored the instrument in reference to the same target employee in the presence of the investigator.

Two Pearson product-moment correlations were used to compute the inter-rater reliability coefficient. The first figure relates to comparisons between raters (organized into rater pairs) scoring the instrument on the total number of employees with mental retardation. However, because the two raters comprising a rater pair could score the instrument on more than one target employee,

there is the potential for bias from overly represented rater pairs. For this reason, a second reliability coefficient was computed to bypass this bias. Raters were therefore grouped into unique rater pairs. One joint scoring of the instrument was therefore randomly selected for each unique rater pair. The comparison of these scores (the second Pearson product-moment correlation) resulted in the second inter-rater reliability correlation. A criterion of .75 was set as the minimum acceptable correlation.

Test-retest Reliability. In the test-retest reliability study, the administration procedures for the first scoring of the instrument (time 1) were the same as those in the inter-rater reliability study. The main difference in this study, was that the employment specialist or supervisor designated as rater 1, scored the instrument a second time (time 2) using the same target employee referent. After the first scoring of the instrument, the student investigator left a copy of the instrument with each rater 1 with the understanding that they would be contacted regarding when to rescore it. The employment specialist or supervisor was then contacted and the instrument rescored. Completed instruments were then returned in self-addressed stamped envelopes. The first administration and second administration were scheduled to differ by a time period of approximately 1 week. The comparison of rater 1's score at time 1 with rater 1's score at time 2 comprised the test-retest reliability study.

A Pearson product-moment correlation coefficient was computed on overall scores to determine test-retest reliability. A criterion of .75 was once again set as the minimum acceptable correlation.

Validity

The Co-worker Involvment Instrument attempts to measure the construct of "co-worker involvement" with employees with handicaps in employment settings. Construct validity was investigated via a study of content validity. The goal of the content validity study was to identify theoretically meaningful factors contributing to an understanding of the construct "co-worker involvement."

A study of face validity was also undertaken to determine whether potential raters of the

instrument agreed that the instrument measured co-worker involvement as they perceived it. This study will be presented first.

Face Validity. In order to determine face validity, the author provided the instrument and manual to potential instrument scorers and asked questions about whether the instrument measured co-worker involvement as they understood it.

Across the state of Illinois there are 49 supported employment projects. The subjects for this study were the directors of these projects. These directors were sent the instrument with manual and an evaluation form. The evaluation forms listed each item followed by the statements, "Yes, it is appropriate to include Item X" or "No, it is not appropriate to include Item X." There was also the opportunity to respond to the statement, "Please indicate whether you feel the overall instrument is appropriate for measuring co-worker involvement" by checking "Yes, it is appropriate" or "No, it is not appropriate." After each question, evaluators' comments were invited. Upon completion, these evaluations were returned to the investigator in self-addressed envelopes.

Evaluation data were compiled for each item and the overall instrument to determine the agreement of the judges' ratings.

Content Validity. The administration procedures described in the test-retest reliability study were also used in the validity study. The two sets of completed instruments (rater1 at time 1 and rater 2 at time 2) were each submitted to analyses that included, a) a factor analysis with the selection of terminal factors via oblique rotation for rater 1 scores at time 1 and rater 1 scores at time 2 and b) the comparison of factors identified via oblique rotation at time 1 with those at time 2 to determine whether there was a developmental trend in scores. Oblique rotation was selected because it was suspected that there were underlying relationships between variables. A criterion of .30 was set for the magnitude of the rotated factor loadings.

Results and Discussion

Reliability

Inter-rater Reliability Study. There were 68 target employees for whom the instrument was scored (see Table 2). Involvement was scored by 30 different raters, the majority of whom were

employment specialists (82%). Because most raters were employment specialists, their familiarity with and involvement at the work site reflects the majority of their experience with the work site. That is, employment specialists would be expected to spend only the amount of time required to support the target employee at the work site, whereas supervisors would be employees of the business where the target employee was working. Most raters therefore were either newly acquainted with the work site (3-5 months, 39%) or had been familiar with the work site for more than 1 year (40%). Additionally, most raters had daily involvement at the work site (66%).

Insert Table 2 about here

Individual and employment demographics are displayed in Table 3. Of the 68 employees who comprised the inter-rater reliability sample, 52 percent were females and 48 percent males. Levels of mental retardation were estimated by IQ scores and compared with the American Association on Mental Deficiency (AAMD) classification schema (Grossman, 1983). Based upon this criteria, 17 percent of workers had IQ scores in the borderline range, 42 percent were in the mild range, 25 percent were in the moderate range, 16 percent were in the severe range of mental retardation and none were in the profound range.

Insert Table 3 about here

Target employees were largely working in enclave placements (clustered enclaves 43%, dispersed enclaves 37%) with a smaller percentage in individual placements (20%). There were no workers in this study working in mobile work crews. They most frequently labored in food service (34%), light industry (31%) or maintenance positions (18%). On the average, they had been working on the job 9 (median) to 14 (mean) months. The median score is more representative of the actual time on the job across the target employees, as one target employee had been employed for 99 months which elevated the target employee time on the job mean.

The Pearson product-moment correlations for the inter-rater reliability studies were r=.82 for the whole group (n=68) and r=.80 for the unique pairs(n=18). These scores surpassed the predetermined criterion for significance of r=.75, therefore supporting the reliability of the instrument across raters.

Test-retest Reliability Study. In the test-retest reliability study, there were 54 target employees on whom co-worker involvement was scored (see Table 1). The instruments were scored by 13 different raters, 89 percent of whom were employment specialists. The mean time period between the first (time 1) and second (time 2) administration of the instrument was nine days. Raters most frequently were familiar with the work site for 3 to 5 months (35%) or for more than 1 year (33%). They most often had daily (59%) involvement at the worksite although many were present 2 to 4 times per week (24%). As mentioned above, the overwhelming majority of scorers being employment specialists, lends credability to employment specialist knowledge of the work site being consistent with rater knowledge of the work site.

Most of the target employees were males (53%) in this study, although not significantly more (females 47%) (see Table 2). As in the inter-rater study, the level of mental retardation of the target employees was most often mild (45%), followed by moderate (27%) and borderline (20%). These employees most often worked in clustered (41%) or dispersed (35%) enclaves, followed by individual (18%) and mobile work crew (6%) placements. Employees most frequently worked in either food service (40%) or maintenance jobs (24%). The mean time on the job for the target employees was 11 months with a range of 35 months.

The Pearson product-moment correlation for the test-retest reliability study was r=.88. This correlation surpassed the criterion of r=.75 and therefore supported the reliability of the instrument over time.

Validity

Face Validity. In order to determine face validity, the author provided a test packet to potential instrument scorers and asked questions about whether the instrument measured co-worker involvement as the potential raters understood it. A total of 22 instrument evaluations were

completed. All but three of the items were considered "appropriate to include" by 90% or more of the raters. Three items (Item 6: Associating Nature, 86%; Item 7: Befriending, 77%; Item 9: Evaluating; 86%) were considered appropriate by less than 90% of the raters. Most importantly, 90% of the raters indicated that overall, "the Co-worker Involvement Instrument is appropriate for measuring co-worker involvement."

Content Validity. Two factor analyses were completed for the validity study. The first analysis used ratings completed by rater 1 at time 1 and the second factor analysis used ratings completed by rater 1 at time 2. The following is a description of factors resulting from each of these analyses.

Insert Table 4 about here

The first analysis (rater 1 time 1) resulted in three factors (see Table 4). Factor 1 contained 7 items including, physical integration (Item 1), social integration (Item 2), vocational integration (Item 3), associating frequency (Item 5), associating nature (Item 6), advocating (Item 8) and information giving (Item 10). This factor accounted for 80 percent of the variance, indicating that co-worker involvement as measured is largely a 1 factor construct. This factor comprises the variables impacting the opportunity for involvement (integration items) and the volitional roles (except for befriending which will be addressed later). Training and evaluating loaded on this factor but they also loaded highly on a second factor which will be discussed separately. This combination of integration and volitional roles is interesting. Integration would most probably have the greatest impact on all of the volitional roles with the exception of befriending, due to the way it is defined. If target employees and co-workers were not integrated, there would be little opportunity to associate, advocate or provide information in spite of a desire on the part of co-workers to do so. This would be true for each of the volitional roles. However, in the case of befriending, by definition, occurrence was based upon interactions outside of the workplace. So, although one would assume that initial contacts would be made during the work day, befriending as defined may not necessarily relate to integration.

Factor 2 was comprised of the prescribed roles and accounted for 12 percent of the variance. These roles were training (Item 4) and evaluating (Item 9). Advocating also loaded on factor two, but not as greatly as on factor 1. Interestingly, the 3 integration variables loaded negatively or close to zero on this factor, the strongest being vocational integration (-.46) followed by physical integration and social integration. In the case of vocational integration, this significantly negative loading implies that prescribed roles are most evident when vocational integration is low and least evident when vocational integration is high. Intuitively, this makes sense. As a person becomes more vocationally competent, he or she would receive less training and their evaluation schedule would more approximate that experienced by co-workers.

In regards to social integration, the loadings were not as strong. However, the negative relationship to prescribed roles may be explained in a manner similar to that for vocational integration. That is, as prescribed roles are increasingly evidenced, social integration decreases and as prescribed roles are less evident, there is increased social integration. Once again, this seems logical. As an employee becomes more competent at her or his job, the amount of training and evaluating would approach levels experienced by co-workers, which are most probably low. Also, with increased competence, there would most likely be increased opportunities to interact with co-workers and still complete ones work. The reverse would also be true. With decreased competence, there would be heightened levels of training and evaluating, and there would be less social integration as the worker struggles to "keep up."

Lastly, there was no relationship between prescribed roles and physical integration. This might imply that trainers or evaluators of employees with handicaps are not necessarily those with whom the target employee is physically integrated. Perhaps they are located in a different area of the business. If this is the case, it suggests there might have been a misunderstanding of the definition of "co-worker" among raters, or may further support the concept of association independent co-worker roles which will be discussed later.

The final factor, Befriending (Item 7), accounted for 8 percent of the variance. This was the only factor on which Befriending loaded. Training also loaded on factor 3, but there was

confounding as training loaded highly on all three factors.

The second factor analysis (rater1 time 2) also resulted in three factors. Factor 1 was comprised of the three integration items and the two associating items. The remarkably high loadings of these variables indicates a strong relationship between associating and integration. This finding is as would be expected, and therefore supports the validity of the instrument. This factor accounted for 74 percent of the variance.

The second factor included befriending (Item 7), advocating (Item 8), evaluating (Item 9) and information giving (Item 10). At first glance this factor is difficult to interpret. Upon further examination, however, it might be referred to as the non-interactive or non-associative co-worker involvement factor. If the items not highly loaded on this factor are compared with those in the other two factors, it is observed that in each of the other two factors the associating items load significantly. However, in the case of factor 2, there was no relationship between associating and the factor. It therefore might be concluded that there is at least a component of each of the roles in factor 2, which does not require association between co-workers and employers with handicaps in the workplace. As was already pointed out, befriending is defined on the basis of interactions outside of the workplace. Regarding advocating, a large percentage of advocating is done on behalf of the target employee without associations with him or her. Evaluation in the workplace very often only involves interactions if work performance is substandard. This leaves information giving. One aspect of the definition of information giving in the instrument is that co-workers will answer questions. However, a person who is willing to answer questions may not be approached. He or she would still be regarded as fulfilling the information giving role without there being any interactions between co-worker and target employee. This factor accounted for 16 percent of the variance.

The final factor could be referred to as the "association dependent" factor and accounts for the remaining 10 percent of the variance. This factor recieved high loadings on the two associating variables (Items 5 and 6), advocating (Item 8) and information giving (Item 10). If factor two relates to aspects of co-worker involvement roles not requiring association in the workplace, perhaps this factor engendors interactive aspects, or co-worker roles requiring work site

affiliation. Interestingly, information giving and advocating both include aspects which require association with the target employee. However, befriending (which does not load on this factor) as mentioned earlier is defined as interactions outside of the workplace. Evaluation which also did not load on this factor may represent the type of evaluation most probably experienced by the majority of entry level employees, in which communication of evaluative information only occurs when performance is substandard. However, the observation that there is no relationship between physical integration and this factor may cause the reader to question this interpretation.

The factors and their proposed interpretations thus are as shown in Table 4. For the first factor analysis, factor 1 was was interpreted as integration/volitional roles, factor 2 as prescribed roles and factor 3 as befriending. For the second analysis, factor 1 was interpreted as integration/association, factor 2 as association independent co-worker roles and factor 3 as association dependent co-worker roles.

The next step of the validity study was to assess whether there was a developmental trend in the data over the time period between the two factor analyses. Although the interpretation of factors differs to some extent between the two analyses, if one were to compare the actual factors, there was a great deal of similarity. The two factor 1's each had 5 variables in common (physical integration, social integration, vocational integration, associating frequency and associating nature). Factor 2 also showed some commonality in that 2 variables loaded highly (advocating and evaluating) from each study. The only real disagreements occurred in relation to training, befriending and information giving. In the case of training, this variable did not load on any of the factors in the second analysis although it did load significantly on all three factors in the first analysis. The befriending item was a separate factor in analysis 1 whereas it joined several other variables in comprising factor 2 in analysis 2. Information giving loaded with the other factor 1 volitional roles in analysis 1, but was loaded across two different factors in analysis 2. Therefore it appears that overall, there was more of a stable trend between the two studies than a developmental trend, as 7 out of 10 variables were virtually identical in terms of their factor loadings. Considered together, therefore, these findings support the validity of the instrument.

Conclusions

Reliability of the Co-worker Involvement Instrument

The reliability study was broken into studies of inter-rater reliability and test-retest reliability. The Standards for Educational and Psychological Testing (American Psychological Association, 1985) state that, "Where judgmental processes enter into the scoring of a test, evidence on the degree of agreement between independent scorings should be provided" (p. 22). This standard provided the basis for the inclusion of each of the reliability studies.

In order to conform with these and other standards, studies of inter-rater reliability were completed. The first sample was comprised of all ratings (n=68) made by rater pairs. Based upon the ratings of these rater pairs, in which each member of the pair scored the instrument independently in reference to a particular target employee, the total score inter-rater reliability was estimated to be .82. In the second sample, there were 18 different rater pairs who scored the instrument. Based upon these ratings of unique rater pairs, the total score inter-rater reliability was estimated to be .80.

In order to determine whether there were differences in independent ratings when separated by a period of time, a study of test-retest reliability was undertaken. This is further fulfillment of the "independent scorings" criteria described earlier (American Psychological Association, 1985). Based upon the comparison of ratings by the same rater separated by a period of time, the total score test-retest reliability was estimated to be .88.

In each of these cases, the reliability estimate surpassed the predetermined criterion of .75. These analyses support the Co-worker Involvement Instrument as a reliable instrument both across raters and over time.

Methodologically, there were two potential limitations to the reliability studies. The design of the inter-rater study was such that there was the potential for over-representation of rater pairs. This limitation was circumvented by calcualting a separate reliability coefficient using 18 unique rater pairs. However, this sample size might be considered small by some. Although in each analysis, findings did exceed criterion, there remains the possibility that the

"supporting" analysis did not comprise a large enough sample.

A second potential methodological weakness related to the time period which elapsed between the two instrument scorings in the test-retest study. The American Psychological Association (1985) indicate that the time interval should represent the nature of the assessment device and its interpretation. It is difficult to determine what that time period should be for the Co-worker Involvement Instrument. With further research, it may be found that a time period different from the one used in this study is more desirable.

In spite of these methodological limitations, the Co-worker Involvement Instrument appears to be a useful tool. Reliability estimates were good, exceeding .80 in all studies.

Validity of the Co-worker Involvement Instrument

The validity of the Co-worker Involvement Instrument was supported by the face validity study. Only one item was considered appropriate to include by less than 80 percent of raters. Most importantly, the instrument overall was considered an appropriate measure of co-worker involvement by 90 percent of the raters.

Anastasi (1982) states that "Any data throwing light on the nature of the trait under consideration and the conditions affecting its development and manifestations are grist for this validity mill" (p. 144). The validity study uncovered new aspects of co-worker involvement. That co-worker involvement consists of roles which can be divided into volitional and prescribed roles was supported by factor analyses. Volitional roles (associating, advocating, information giving) appear to be related to the degree of integration of the employee with handicaps. On the contrary, prescribed roles (training and evaluating) are less influenced by integration. Befriending as a volitional role appears to not be influenced by integration, although this may be an artifact of the Co-worker Involvement Instrument's definition of befriending.

Apparently, that co-worker involvement may be broken into aspects demanding association/affiliation between co-workers and workers with disabilities, and aspects independent of affiliation. The former of these relationships (association being related to

integration), seems intuitively correct. In order to associate, persons must be in proximity to one another (excluding association via electronic media). The latter of these observations supports statements made earlier regarding federal integration legislation in that integration alone may not result in co-worker involvement as there are aspects of involvement which may not be directly related to integration. However, in order that this statement may not be misconstrued, the finding implies that integration alone is not sufficient. There appear to be important "behind the scenes" aspects of co-worker involvement which do not directly relate to affiliation. Co-worker involvement therefore cannot be totally explained by characteristics of individuals. Interventions must now be directed toward interactions among small group members not necessarily involved with the target employee. These aspects of co-worker involvement must be further explored and brought to light in order to dilate the focus of intervention.

Together these observations support to the instrument's validity. Additionally, the lack of a developmental trend across the factor analyses supports the instrument as measuring a stable construct.

Applications of the Co-worker Involvement Instrument

The Co-worker Involvement Instrument in its current form has several useful applications. First, it is a useful research tool for the study of small group interactions in the workplace. This is evidenced by other studies reported by McNair (McNair, 1989a; McNair, 1989b). Secondly, the instrument might be used in job survey and analysis procedures. If an employee with handicaps is already employed by a particular agency or business, the instrument might be scored in reference to that employee before future individuals are placed in that same employment setting. This information might also therefore be used in job match activities. Should the client be the first to be placed in that particular setting, co-worker involvement among non-handicapped workers might be tested with conclusions being drawn from that information. It is important to note, however, that to date Co-worker Involvement Instrument studies of nonhandicapped workers have not been reported so the relationship between

Interactions among non-handicapped workers and between non-handicapped workers with workers with handicaps is still unknown.

Then there is the possibility that the instrument might provide indications of how co-worker involvement is influenced by the training of individuals with handicaps. It may be that target employee competencies are directly related to co-worker involvement. Therefore if the goal of intervention with an employee with handicaps is to gain support from co-workers, the instrument might be used as a measure of the effect of that intervention.

In sum the Co-worker Involvement Instrument is a psychometrically tested and useful tool for studying interactions between workers in the employment context.

Notes

[1] The contents of this paper were developed under federal contract number 300-85-0160 from Special Education Programs, under the Office of Special Education and Rehabilitative Services (OSERS), U.S. Department of Education. Points of view or opinions do not necessarily represent OSERS positions or policy.

[2] Requests for copies of the Co-worker Involvement Instrument should be sent to Frank R. Rusch, Secondary Transition Intervention Effectiveness Institute, The University of Illinois at Urbana-Champaign, 1310 South Sixth Street, Champaign, Illinois 61820.

Requests for copies of the this article should be sent to Jeff McNair, School of Education, California State University San Bernadino, 5500 University Parkway, San Bernadino, CA. 92407-2397.

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Table 1
The Co-worker Involvement Instrument Items

Item 1: Physical Integration- Target employee works, takes breaks, and eats meals in the same areas at the same time as co-workers.

2 - Target employee works in the same work areas at the same time as co-workers a portion of the day and takes breaks and eats meals in the same areas (i.e., in the same room, within 600 square feet) as co-workers.

1 - Target employee does not work in the same areas at the same time as co-workers but takes breaks and/or eats meals in the same areas as co-workers.

0 - Target employee does not work, take breaks, or eat meals in the same areas or at the same time as co-workers.

Item 2: Social Integration- While completing his/her work, the target employee has an appropriate number of opportunities to interact with coworkers without negative effects on job performance.

2 - There are an appropriate number of opportunities for the target employee to interact with coworkers without negative effects on job performance.

1 - There are few opportunities for the target employee to interact with coworkers without negative effects on job performance.

0 - There are no opportunities for the target employee to interact with coworkers without negative effects on job performance.

Item 3: Vocational Integration- Target employee performs tasks similar to co-worker. Co-worker is not responsible for any portion of the target employee's work.

2 - Target employee performs same or comparable tasks as co-worker with same job title.

1 - Target employee does not perform same or comparable tasks as co-worker with same job title, however, co-worker is not responsible for any portion of the target employee's work.

0 - Co-worker is responsible for partial completion of target employee's work.

Item 4: Training- Co-worker supports target employee by providing on-the-job training of social or vocational skills which have been identified in the IWRP.

2 - Co-worker is designated for and provides on-the-job training of social or vocational skills for the target employee

1 - Co-worker provides on-the-job training of social or vocational skills to a target employee only with the prompting or assistance of others (e.g., from a job coach or supervisor).

0 - Co-worker does not provide on-the-job training of social or vocational skills to a target employee.

Item 5: Associating (frequency)- Co-worker socially interacts with target employee at the work place.

2 - Co-worker socially interacts with target employee at the work place on a regular basis, typically on a daily basis.

1 - Co-worker interacts with the target employee at the work place on an irregular basis, usually only a few times per week.

0 - Co-worker intreacts socially with target employee at the workplace once or twice a month. Interactions are not intentional.

Table 1 (continued)

Item 6: Associating (nature)-Co-worker socially interacts with the target employee in a manner considered appropriate within the context of the workplace.

2 - The majority of co-workers' social interactions by intention with target employee are considered appropriate within the context of the workplace.

1 - The majority of co-workers' social interactions by intention with target employee are not considered appropriate within the context of the workplace.

0 - There are no social interactions or social interactions by intention considered appropriate within the context of the workplace between the target employee and co-workers.

Item 7: Befriending- Co-worker befriends target employee by intentionally interacting socially with the target employee outside of the workplace.

2 - Co-worker and target employee report intentionally interacting socially outside the workplace within the last two weeks.

1 - Co-worker and target employee report intentionally interacting socially outside the workplace at least once in the last month.

0 - Co-worker and target employee report not interacting socially outside the workplace.

Item 8: Advocating- The co-worker advocates for the target employee by optimizing, protecting, and supporting the target employee's employment status.

2 - Co-worker optimizes, protects and supports the target employee's employment status. This level of support is provided by the co-worker when needed without the assistance or prompting of others.

1 - Co-worker optimizes, protects and supports the target employee's employment status. This level of support is provided by the co-worker when needed with assistance and/or prompting from others.

0 - Co-worker does not advocate (optimize, protect, support) for target employee's employment status.

Item 9: Evaluating- Co-worker, when assigned the supervisory responsibility of evaluating the target employee, appraises target employee's performance according to an operationalized standard and provides direct, appropriate (written/verbal) feedback to the target employee on a scheduled or informal basis.

2 - Co-worker, when acting as supervisor, appraises target employee's performance according to an operationalized standard and provides direct, appropriate (written/verbal) feedback to the target employee on a scheduled or informal basis.

1 - Co-worker, when acting as supervisor, evaluates target employee's performance inconsistently (with or without an operationalized standard, with or without providing appropriate written/verbal feedback to the target employee) and only provides feedback if performance is perceived to be substandard.

0 - Co-worker, when acting as supervisor, does not evaluate and is unaware of target employee's performance.

Item 10: Information Giving- Co-worker acts as a source of information by spontaneously volunteering instruction/feedback (regarding vocational skills, social skills, etc.) and in answering target employee's questions.

2 - Co-worker spontaneously volunteers instruction/feedback and answers questions for the target employee.

1 - Co-worker provides information to the target employee only when directly asked a question.

0 - Co-worker discourages target employee's information seeking behavior by not providing information or answering questions.

Table 2
Rater Characteristics by Reliability Study*

	Reliability Study	
	Inter-rater	Test-retest
N=(number of target employees)	68	54
Instrument Rater:		
Employment Specialist	82	89
Supervisor	18	11
Rater's Familiarity with Work Site:		
3-5 Months	39	35
6-9 Months	16	24
10-12 Months	5	8
More than 1 year	40	33
Rater's Involvement at Work Site:		
Daily	66	59
2-4 Times per week	16	24
Once a week	3	4
3 Times per month	0	0
Twice per month	3	4
Once per month	6	7
Less than once per month	6	2

*all figures are percentages unless otherwise indicated

Table 3
Individual and Employment Demographics by Reliability Study*

	Reliability Study	
	Inter-rater	Test-retest
N=(number of target employees)	68	54
Sex of target employee		
Male	48	53
Female	52	47
Level of Mental Retardation		
Borderline or no Mental Retardation	17	20
Mild	42	45
Moderate	25	27
Severe	16	8
Profound	0	0
Target Employee's Time On the Job (months):		
Median	9	7
Mean	14	11
Range	98	35
Type of Placement:		
Individual	20	18
Clustered Enclave	43	41
Dispersed Enclave	37	35
Mobile Work Crew	0	6
Type of Job:		
Light Industrial	31	15
Laundry	3	4
Warehouse	7	9
Maintenance	18	24
Retail	0	0
Food Service	34	40
Clerical	4	4
Health Care	3	4

*all figures are percentages unless otherwise indicated

Table 4

A Comparison of the Validity Study Factor Analyses

ITEM	FACTOR 1		FACTOR 2		FACTOR 3	
	Integration/Volition	Integration/Association	Prescribed Roles	Association Independent Roles	Befriending	Association Dependent Roles
1. Physical Integration	.99	.92	-.23	.05	-.31	.08
2. Social Integration	.83	.91	.04	.10	-.00	-.22
3. Vocational Integration	.69	.57	-.41	.20	.31	-.07
4. Training	.41	.27	.40	-.09	.32	.24
5. Associating Frequency	.90	.58	-.01	-.16	.01	.56
6. Associating Nature	.86	.72	.03	-.01	-.07	.37
7. Befriending	.11	.04	-.03	.34	.42	-.03
8. Advocating	.50	.06	.40	.55	.07	.33
9. Evaluating	.33	.13	.47	.51	.11	.14
10. Information Giving	.79	.14	-.02	.54	.13	.44

Factor Analysis 1 (rater 1 time 1)

Factor Analysis 2 (rater 1 time 2)

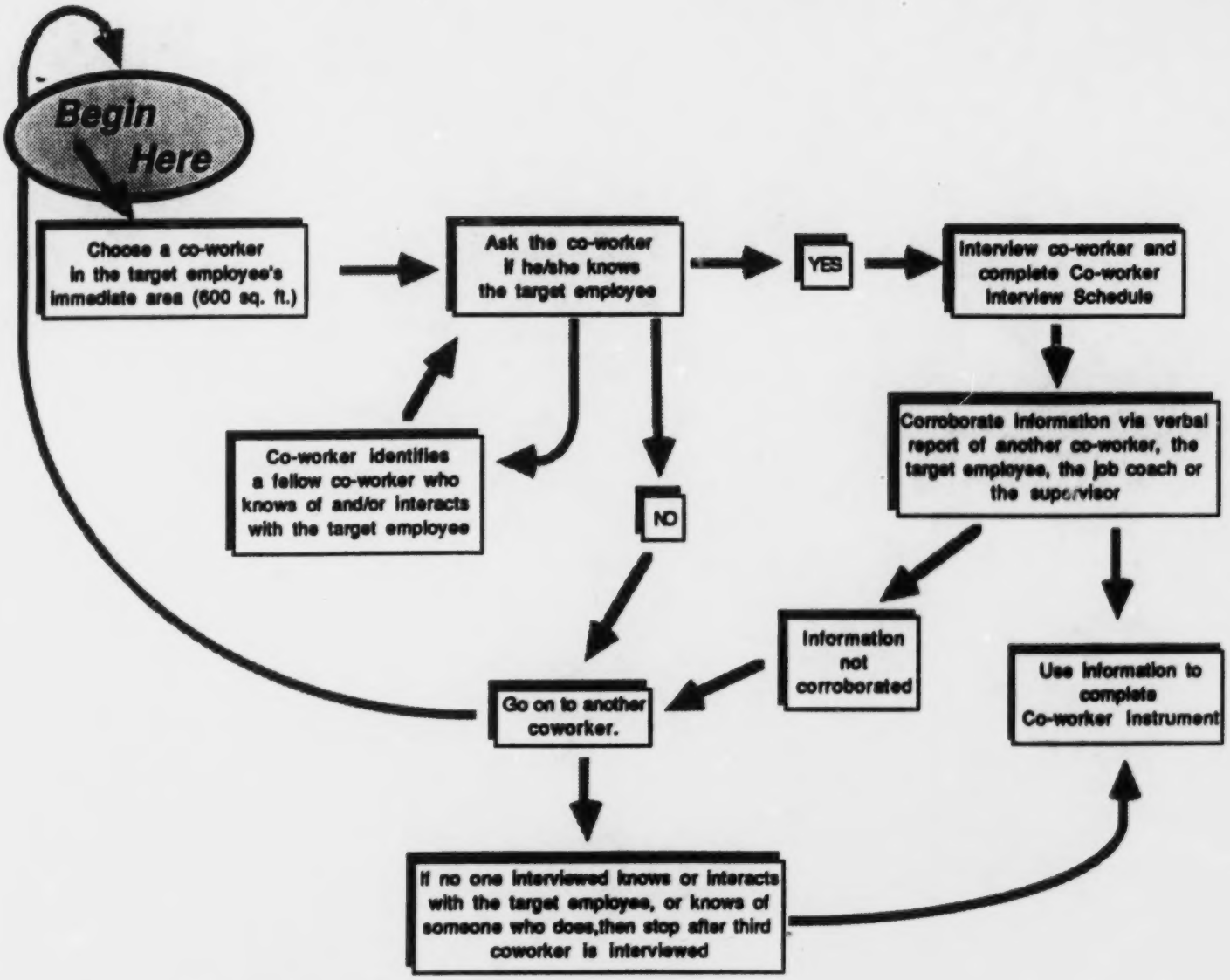
Begin Here
Choose a co-worker in the target employee's immediate area (600 sq. ft.)
Ask the co-worker if he/she knows the target employee
YES
Interview co-worker and complete Co-worker Interview Schedule
Co-worker identifies a fellow co-worker who knows of and/or interacts with the target employee
NO
Corroborate information via verbal report of another co-worker, the target employee, the job coach or the supervisor
Information not corroborated
Use information to complete Co-worker Instrument
Go on to another coworker.
If no one interviewed knows or interacts with the target employee, or knows of someone who does,then stop after third coworker is interviewed

Figure 1. Co-worker Identification and Interview Procedure.

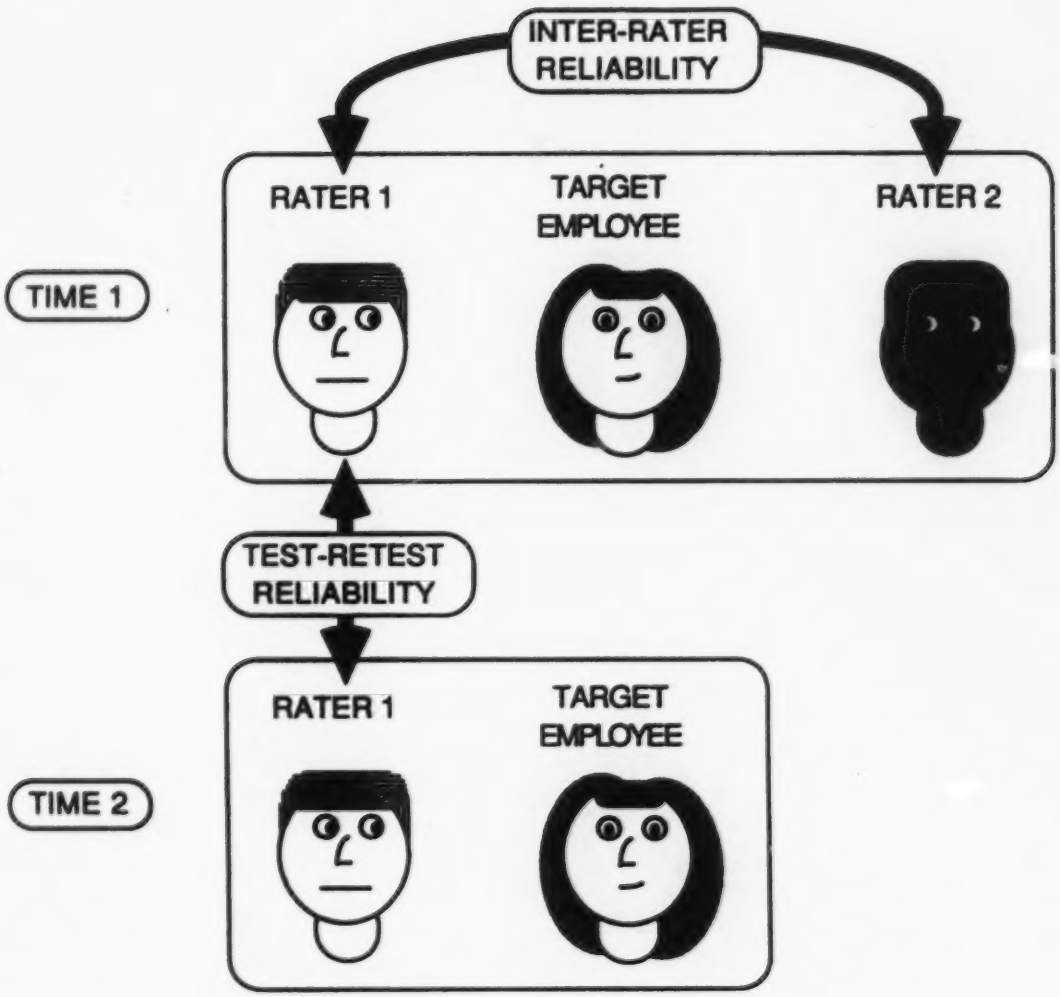

Figure 2. Organization of the reliability studies.